STATE OF MAINE DEPARTMENT OF ENVIRONMENTAL PROTECTION



PATRICIA W. AHO

MSAD #61 Lake Region High School Cumberland County Naples, Maine A-122-71-H-A

Departmental
Findings of Fact and Order
Air Emission License
Amendment #1

FINDINGS OF FACT

After review of the air emissions license amendment application, staff investigation reports and other documents in the applicant's file in the Bureau of Air Quality, pursuant to 38 M.R.S.A., §344 and §590, the Department of Environmental Protection (the Department) finds the following facts:

I. REGISTRATION

A. Introduction

- 1. Maine Administrative School District #61, Lake Region High School (Lake Region) was issued Air Emission License A-122-71-G-R/A on July 25, 2013 permitting the operation of emission sources associated with their educational facility located at 1877 Roosevelt Trail, Naples, ME.
- 2. Lake Region has requested an amendment to their air emissions license to allow the replacement of their existing wood pellet boiler (Boiler #3) with a new wood pellet boiler.

B. Emission Equipment

The following equipment is addressed in this air emission license:

Boilers

Unit	Maximum Capacity (MMBtu/hr)	Maximum Firing Rate	Fuel Type, % sulfur	Date of Manufacture	Stack #
Boiler #3	1.7	221 lb/hr	woodpellets	2014	1

Departmental
Findings of Fact and Order
Air Emission License
Amendment #1

C. Application Classification

A new emission unit at an existing minor source is considered a major modification based on whether or not expected emission increases exceed the "Significant Emission" levels as defined in 06-096 CMR 100. The emission increases for a new emission unit are determined by the maximum future license annual emissions for the new emission unit, as follows:

Pollutant	Max. Future License (TPY)	Significant Emission Levels		
PM	0.8	100		
PM ₁₀	0.8	100		
SO_2	0.2	100		
NO_x	3.7	100		
CO	4.5	100		
VOC	0.2	50		
$\mathrm{CO}_2\mathrm{e}$	< 100,000	100,000		

This modification is determined to be a minor modification and has been processed as such.

II. BEST PRACTICAL TREATMENT (BPT)

A. Introduction

In order to receive a license, the applicant must control emissions from each unit to a level considered by the Department to represent Best Practical Treatment (BPT), as defined in *Definitions Regulation*, 06-096 CMR 100 (as amended). Separate control requirement categories exist for new and existing equipment as well as for those sources located in designated non-attainment areas.

BPT for new sources and modifications requires a demonstration that emissions are receiving Best Available Control Technology (BACT), as defined in *Definitions Regulation*, 06-096 CMR 100 (as amended). BACT is a top-down approach to selecting air emission controls considering economic, environmental and energy impacts.

Departmental
Findings of Fact and Order
Air Emission License
Amendment #1

B. Facility Description

Lake Region operates two small oil-fired boilers (Boilers #1 and #2 each rated with a maximum heat input design capacity of 4.9 MMBtu/hr) and one wood pellet boiler (Boiler #3) which are used to provide heat and hot water for the school's building complex. Boiler #3 is being replaced with a smaller more efficient wood pellet boiler. The currently licensed wood pellet boiler had a maximum design heat input capacity of 8.7 MMBtu/hr, the new boiler will be 1.7 MMBtu/hr and also be designated as Boiler #3. A flue gas blower vents the boiler's combustion gases to a common 49 foot above ground level (AGL) stack.

3

C. BACT for the wood pellet boiler (Boiler #3)

Particulate Matter (PM)

The combustion of solid fuel such as wood creates particulate that can become entrained in the combustion gas. PM emission control devices applicable to conventional biomass-fired boilers include cyclonic separators (multi-cyclones), wet scrubbers, electrified filter beds, electrostatic precipitators (ESPs), and fabric filters. Lake Region plans to use a multi-cyclone to control PM emissions. To meet BACT, Lake Region will employ good combustion control and use a multi-cyclone which will limit maximum PM emissions to a rate of 0.10 lbs/MMBTU. The resulting potential annual PM emissions from the pellet boiler will be less than 1 ton per year.

Selection of BACT for PM

Lake Region will meet BACT for PM by operating a multi-cyclone for Boiler #3 and limiting the emissions to 0.10 lb/MMBtu. The PM and PM10 lb/hr emission limits are derived from the PM lb/MMBtu emission limit.

Nitrogen Oxides (NOx)

NOx is formed during the combustion of biomass in boilers. "Thermal" NOx is formed when atmospheric nitrogen and oxygen present in the combustion air supply react with each other due to high combustion temperatures. "Fuel" NOx is formed when nitrogen present in the fuel source is oxidized during combustion. The biomass fuel to be burned in Lake Region's Boiler #3 will contain relatively small amounts of nitrogen.

With proper combustion controls, NOx emissions from small biomass boilers can generally be limited to relatively low levels. The potential annual NOx emissions from Lake Region's pellet boiler will be less than 4 tons per year through the use

Departmental Findings of Fact and Order Air Emission License Amendment #1

of combustion controls. The use of additional NOx control techniques would not be cost-effective and do not represent BACT for this boiler.

Selection of BACT for NOx

Lake Region shall limit the boiler's NOx emissions to 0.9 lbs/hr and will meet BACT through the use of the boiler's combustion control system.

Sulfur Dioxide (SO₂)

The combustion of biomass fuel in a boiler will result in SO₂ emissions as a result of the oxidation of small amounts of naturally occurring sulfur in the fuel. Biomass fuels contain inherently low sulfur levels.

Selection of BACT for SO₂

Lake Region will meet a BACT lb/hr emission limit of 0.1 for SO₂ through the use of biomass fuel.

Carbon Monoxide (CO) and Volatile Organic Compounds (VOC)

CO and VOC are formed as a result of incomplete combustion of organic material in the furnace.

CO and VOC emissions are controlled by maintaining proper combustion conditions within the furnace. This involves control of excess air levels, distribution of combustion air within the furnace, achieving proper gas turbulence and residence time, and other factors. Add-on pollution control equipment to control CO and/or VOC on Lake Region's pellet boiler would not be economically feasible.

Selection of BACT for CO and VOC

Lake Region will meet BACT by using combustion controls to minimize emissions of CO and VOC. Based on EPA's *Compilation of Air Pollutant Emission Factors*, AP-42, Lake Region shall limit the boiler's CO and VOC emissions to 1.1 lbs/hr and 0.1 lbs/hr, respectively.

1. BACT Findings for Boiler #3

The BACT emission limits for Boiler#3 were based on the following:

PM/PM₁₀ – 0.10 lb/MMBtu based on 06-096 CMR 115, BACT

Departmental
Findings of Fact and Order
Air Emission License
Amendment #1

 $SO_2 - 0.025$ lb/MMBtu based on AP-42 dated 2003 for wood fired boilers $NO_X - 0.49$ lb/MMBtu based on AP-42 dated 2003 for wood fired boilers CO - 0.60 lb/MMBtu based on AP-42 dated 2003 for wood fired boilers VOC - 0.017 lb/MMBtu, based on AP-42 dated 2003 for wood fired boilers

5

The BACT emission limits for the boiler are the following:

Unit	PM (lb/hr)	PM ₁₀ (lb/hr)	SO ₂ (lb/hr)		CO (lb/hr)	VOC (lb/hr)
Boiler #3	0.2	0.2	0.1	0.9	1.1	0.1
(1.7 MMBtu/hr) wood pellets	İ					

Visible emissions from the combined stack (Stack #1) shall not exceed 20% opacity on a 6 minute block average, except for no more than one (1) six (6) minute block average in a 3 hour period.

2. 40 CFR Part 63 Subpart JJJJJJ

Boiler # 3 is subject to the *National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources* (40 CFR Part 63 Subpart JJJJJJ). The unit is a new boiler rated less than 10 MMBtu/hr.

A summary of the currently applicable federal 40 CFR Part 63 Subpart JJJJJJ requirements is listed below. At this time, the Department has not taken delegation of this area source MACT (Maximum Achievable Control Technology) rule promulgated by EPA, however Lake Region is still subject to the requirements. Notification forms and additional rule information can be found on the following website:

http://www.epa.gov/ttn/atw/boiler/boilerpg.html.

- a. Compliance Dates, Notifications, and Work Practice Requirements
 - i. Initial Notification of Compliance

An Initial Notification submittal to EPA for new sources is due within 120 days after the source becomes subject to the standard. [40 CFR Part 63.11225(a)(2)]

- ii. Boiler Tune-Up Program
 - (a) A boiler tune-up program shall be implemented. [40 CFR Part 63.11223]

Departmental Findings of Fact and Order Air Emission License Amendment #1

Note: new sources that have applicable work practice standards or management practices are not required to complete an initial performance tune-up. [40 CFR Part 63.11210(f)] Per EPA, if the regular tune-up is their only requirement, new boilers also do not have to submit a Notice of Compliance Status(NOCS).

(b) Each tune-up shall be conducted at a frequency specified by the rule and based on the size, age, and operations of the boiler. See chart below:

Boiler Category	Tune-Up Frequency
New and Existing Oil, Biomass, and Coal fired Boilers with less frequent tune up requirements	
With a heat input capacity of <5MMBtu/hr	Every 5 years

[40 CFR Part 63.11223(a) and Table 2]

- (c) The boiler tune-up program, conducted to demonstrate continuous compliance, shall be performed as specified below:
 - 1. As applicable, inspect the burner, and clean or replace any component of the burner as necessary. Delay of the burner inspection until the next scheduled shutdown is permitted; not to exceed 36 months from the previous inspection for boilers greater than 5 MMBtu/hr or 72 months from the previous inspection for oil fired boilers less than 5 MMBtu/hr, boilers with oxygen trim systems, seasonal boilers, and limited use boilers. [40 CFR Part 63.11223(b)(1)]
 - 2. Inspect the flame pattern, <u>as applicable</u>, and adjust the burner as necessary to optimize the flame pattern, consistent with the manufacturer's specifications. [40 CFR Part 63.11223(b)(2)]
 - 3. Inspect the system controlling the air-to-fuel ratio, <u>as applicable</u>, and ensure it is correctly calibrated and functioning properly. Delay of the inspection until the next scheduled shutdown is permitted; not to exceed 36 months from the previous inspection for boilers greater than 5 MMBtu/hr or 72 months from the previous inspection for oil fired boilers less than 5 MMBtu/hr, boilers with oxygen trim systems, seasonal boilers, and limited use boilers. [40 CFR Part 63.11223(b)(3)]

Departmental
Findings of Fact and Order
Air Emission License
Amendment #1

- 4. Optimize total emissions of CO, consistent with manufacturer's specifications. [40 CFR Part 63.11223(b)(4)]
- 5. Measure the concentration in the effluent stream of CO in parts per million by volume (ppmv), and oxygen in volume percent, before and after adjustments are made (measurements may be either on a dry or wet basis, as long as it is the same basis before and after the adjustments are made). Measurements may be taken using a portable CO analyzer. [40 CFR Part 63.11223(b)(5)]
- 6. If a unit is not operating on the required date for a tune-up, the tune-up must be conducted within 30 days of start-up. [40 CFR Part 63.11223(b)(7)]
- (d) <u>Tune-Up Report</u>: A tune-up report shall be maintained onsite and, if requested, submitted to EPA. The report shall contain the following information:
 - 1. The concentration of CO in the effluent stream (ppmv) and oxygen (volume percent) measured at high fire or typical operating load both before and after the boiler tune-up;
 - 2. A description of any corrective actions taken as part of the tune-up of the boiler; and
 - 3. The types and amounts of fuels used over the 12 months prior to the tune-up of the boiler, but only if the unit was physically and legally capable of using more than one type of fuel during that period. Units sharing a fuel meter may estimate the fuel use by each unit.

[40 CFR §63.11223(b)(6)]

iii. Compliance Report:

A compliance report shall be prepared by March 1st every five years which covers the previous five calendar years. The report shall be maintained by the source and submitted to the Department and to the EPA upon request. The report must include the items contained in §63.11225(b)(1) and (2), including the following: [40 CFR §63.11225(b)]

- (a) Company name and address;
- (b) A statement of whether the source has complied with all the relevant requirements of this Subpart;
- (c) A statement certifying truth, accuracy, and completeness of the notification and signed by a responsible official and containing

Departmental Findings of Fact and Order Air Emission License Amendment #1

the official's name, title, phone number, email address, and signature;

8

- (d) The following certifications, as applicable:
 - i. "This facility complies with the requirements in 40 CFR §63.11223 to conduct tune-ups of each boiler in accordance with the frequency specified in this Subpart."
 - ii. "No secondary materials that are solid waste were combusted in any affected unit."
 - iii. "This facility complies with the requirement in 40 CFR §§63.11214(d) to conduct a tune-up of each applicable boiler according to 40 CFR §63.11223(b)."

b. Recordkeeping

Records shall be maintained consistent with the requirements of 40 CFR Part 63, Subpart JJJJJJ including the following [40 CFR Part 63.11225(c)]:

- i. Copies of notifications and reports with supporting compliance documentation;
- ii. Identification of each boiler, the date of tune-up, procedures followed for tune-up, and the manufacturer's specifications to which the boiler was tuned;
- iii. Records of the occurrence and duration of each malfunction of each applicable boiler; and
- iv. Records of actions taken during periods of malfunction to minimize emissions, including corrective actions to restore the malfunctioning boiler.

Records shall be in a form suitable and readily available for expeditious review. EPA requires submission of Notification of Compliance Status reports for tune-ups and energy assessments through their electronic reporting system. [63.1125(a)(4)(vi)]

D. Annual Emissions

1. Total Annual Emissions

The potential annual emissions from Lake Region's site are based on a maximum annual fuel oil consumption level of 75,000 gallons for the oil-fired boilers and a maximum annual wood pellet fuel consumption level of 919 tons. Lake Region's actual consumption levels for fuel oil and wood pellets are expected to be significantly less than the maximum levels listed above. The maximum fuel consumption levels listed above were selected to ensure that the annual potential emissions were conservatively calculated.

Departmental
Findings of Fact and Order
Air Emission License
Amendment #1

Total Licensed Annual Emissions for the Facility Tons/year

9

(used to calculate the annual license fee)

	PM	PM ₁₀	SO ₂	NO _x	CO	VOC
Boiler #1 and #2	0.7	0.7	2.7	2.1	0.2	0.1
Boiler #3	0.8	0.8	0.2	3.7	4.5	0.2
Total TPY	1.5	1.5	2.9	5.8	4.7	0.3

2. Greenhouse Gases

Greenhouse gases are considered regulated pollutants as of January 2, 2011, through 'Tailoring' revisions made to EPA's Approval and Promulgation of Implementation Plans, 40 CFR Part 52, Subpart A, §52.21, Prevention of Significant Deterioration of Air Quality rule. Greenhouse gases, as defined in 06-096 CMR 100 (as amended), are the aggregate group of the following gases: carbon dioxide, nitrous oxide, methane, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. For licensing purposes, greenhouse gases (GHG) are calculated and reported as carbon dioxide equivalents (CO₂e).

The quantity of CO₂e emissions from this facility is less than 100,000 tons per year, based on the following:

- the facility's fuel use limits;
- worst case emission factors from the following sources: U.S. EPA's AP-42, the Intergovernmental Panel on Climate Change (IPCC), and 40 CFR Part 98, *Mandatory Greenhouse Gas Reporting*; and
- global warming potentials contained in 40 CFR Part 98.

No additional licensing actions to address GHG emissions are required at this time.

III. AMBIENT AIR QUALITY ANALYSIS

The level of ambient air quality impact modeling required for a minor source shall be determined by the Department on a case-by case basis. In accordance with 06-096 CMR 115, an ambient air quality impact analysis is not required for a minor source if the total licensed annual emissions of any pollutant released do not exceed the following levels and there are no extenuating circumstances:

Pollutant	Tons/Year
PM_{10}	25
SO_2	50

NO _x	50
CO	250

10

The total licensed annual emissions for the facility are below the emission levels contained in the table above and there are no extenuating circumstances; therefore, an ambient air quality impact analysis is not required as part of this license.

ORDER

Based on the above Findings and subject to conditions listed below, the Department concludes that the emissions from this source:

- will receive Best Practical Treatment,
- will not violate applicable emission standards, and
- will not violate applicable ambient air quality standards in conjunction with emissions from other sources.

The Department hereby grants Air Emission License A-122-71-H-A subject to the conditions found in Air Emission License A-122-71-G-R/A, and in the following conditions:

<u>Severability</u>. The invalidity or unenforceability of any provision, or part thereof, of this License shall not affect the remainder of the provision or any other provisions. This License shall be construed and enforced in all respects as if such invalid or unenforceable provision or part thereof had been omitted.

The following Specific Condition (17) shall replace Specific Condition (17) in Air Emission License A-122-71-G-R/A:

(17) **Boiler #3**

- A. Lake Region shall fire wood pellets in Boiler #3 as described in this air emissions license. A multi-cyclone shall be operated to minimize particulate emissions and log of its maintenance shall be maintained.
- B. Emissions shall not exceed the following:

	Unit		Pollutant	lb/MMBtu	Origin and Authority
Boiler #3		PM	0.10	06-096 CMR 115, BACT	

11

C. Emissions shall not exceed the following: [06-096 CMR 115, BACT]

Emission	PM	PM ₁₀	SO ₂ (lb/hr)	NO _x	CO	VOC
Unit	(lb/hr)	(lb/hr)		(lb/hr)	(lb/hr)	(lb/hr)
Boiler #3	0.2	0.2	0.1	0.9	1.1	0.1

- D. Visible emissions from the combined stack (Stack #1) shall not exceed 20% opacity on a six (6) minute block average, except for no more than one (1) six (6) minute block average in a continuous 3-hour period. [06-096 CMR 115, BACT]
- E. Boiler MACT (40 CFR Part 63, Subpart JJJJJJ) Requirements for Boiler #3 [incorporated under 06-096 CMR 115, BACT]
 - 1. An Initial Notification submittal to EPA is due within 120 days after the source becomes subject to the standard. [40 CFR Part 63.11225(a)(2)]
 - 2. The facility shall implement a boiler tune-up program. [40 CFR Part 63.11223]

Note: new sources that have applicable work practice standards or management practices are not required to complete an initial performance tune-up. [40 CFR Part 63.11210(f)] Per EPA, if the regular tune-up is their only requirement, new boilers also do not have to submit a Notice of Compliance Status(NOCS).

(a) Each tune-up shall be conducted at a frequency specified by the rule and based on the size, age, and operations of the boiler. See chart below:

Boiler Category	Tune-Up Frequency
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With a heat input capacity of <5MMBtu/hr	Every 5 years

[40 CFR Part 63.11223(a) and Table 2]

(b) The boiler tune-up program, conducted to demonstrate continuous compliance, shall be performed as specified below:

12

- 1. As applicable, inspect the burner, and clean or replace any component of the burner as necessary. Delay of the burner inspection until the next scheduled shutdown is permitted; not to exceed 36 months from the previous inspection for boilers greater than 5 MMBtu/hr or 72 months from the previous inspection for oil fired boilers less than 5 MMBtu/hr, boilers with oxygen trim systems, seasonal boilers, and limited use boilers. [40 CFR Part 63.11223(b)(1)]
- 2. Inspect the flame pattern, <u>as applicable</u>, and adjust the burner as necessary to optimize the flame pattern, consistent with the manufacturer's specifications. [40 CFR Part 63.11223(b)(2)]
- 3. Inspect the system controlling the air-to-fuel ratio, <u>as applicable</u>, and ensure it is correctly calibrated and functioning properly. Delay of the inspection until the next scheduled shutdown is permitted; not to exceed 36 months from the previous inspection for boilers greater than 5 MMBtu/hr or 72 months from the previous inspection for oil fired boilers less than 5 MMBtu/hr, boilers with oxygen trim systems, seasonal boilers, and limited use boilers. [40 CFR Part 63.11223(b)(3)]
- 4. Optimize total emissions of CO, consistent with manufacturer's specifications. [40 CFR Part 63.11223(b)(4)]
- 5. Measure the concentration in the effluent stream of CO in parts per million by volume (ppmv), and oxygen in volume percent, before and after adjustments are made (measurements may be either on a dry or wet basis, as long as it is the same basis before and after the adjustments are made). Measurements may be taken using a portable CO analyzer. [40 CFR Part 63.11223(b)(5)]
- 6. If a unit is not operating on the required date for a tune-up, the tune-up must be conducted within 30 days of start-up. [40 CFR Part 63.11223(b)(7)]
- (c) <u>Tune-Up Report</u>: A tune-up report shall be maintained onsite and, if requested, submitted to EPA. The report shall contain the following information:
 - 1. The concentration of CO in the effluent stream (ppmv) and oxygen (volume percent) measured at high fire or typical operating load both before and after the boiler tune-up;
 - 2. A description of any corrective actions taken as part of the tune-up of the boiler; and

Departmental Findings of Fact and Order Air Emission License Amendment #1

13

3. The types and amounts of fuels used over the 12 months prior to the tune-up of the boiler, but only if the unit was physically and legally capable of using more than one type of fuel during that period. Units sharing a fuel meter may estimate the fuel use by each unit.

[40 CFR §63.11223(b)(6)]

3. Compliance Report:

A compliance report shall be prepared by March 1st every five years which covers the previous five calendar years. The report shall be maintained by the source and submitted to the Department and to the EPA upon request. The report must include the items contained in §63.11225(b)(1) and (2), including the following: [40 CFR §63.11225(b)]

- (a) Company name and address;
- (b) A statement of whether the source has complied with all the relevant requirements of this Subpart;
- (c) A statement certifying truth, accuracy, and completeness of the notification and signed by a responsible official and containing the official's name, title, phone number, email address, and signature;
- (d) The following certifications, as applicable:
 - i. "This facility complies with the requirements in 40 CFR §63.11223 to conduct tune-ups of each boiler in accordance with the frequency specified in this Subpart."
 - ii. "No secondary materials that are solid waste were combusted in any affected unit."
 - iii. "This facility complies with the requirement in 40 CFR §§63.11214(d) to conduct a tune-up of each applicable boiler according to 40 CFR §63.11223(b)."

4. Recordkeeping

Records shall be maintained consistent with the requirements of 40 CFR Part 63, Subpart JJJJJJ including the following [40 CFR Part 63.11225(c)]:

- i. Copies of notifications and reports with supporting compliance documentation;
- ii. Identification of each boiler, the date of tune-up, procedures followed for tune-up, and the manufacturer's specifications to which the boiler was tuned;
- iii. Records of the occurrence and duration of each malfunction of each applicable boiler; and

Departmental
Findings of Fact and Order
Air Emission License
Amendment #1

14

iv. Records of actions taken during periods of malfunction to minimize emissions, including corrective actions to restore the malfunctioning boiler.

Records shall be in a form suitable and readily available for expeditious review. EPA requires submission of Notification of Compliance Status reports for tune-ups and energy assessments through their electronic reporting system. [63.1125(a)(4)(vi)]

DONE AND DATED IN AUGUSTA, MAINE THIS 2 DAY OF March , 2015.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

PATRICIA W. AHO. COMMISSIONER

The term of this license shall be concurrent with the term of Air Emission License A-122-71-G-R/A.

PLEASE NOTE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES

Date of initial receipt of application: <u>December 12, 2014</u> Date of application acceptance: December 23, 2014

Date filed with the Board of Environmental Protection:

This Order prepared by Edwin Cousins, Bureau of Air Quality

